

Rangeland Restoration Academy

Statement of Steven Rich and Sheldon Kinsel

Utah Commission for the Stewardship of Public Lands

July 16, 2015

We appreciate the opportunity to present our perspective on the approach to dealing with the climate debate that is called for in HCR 8 passed by the last legislature. For the past six years we have discussed this approach with a range of policy makers, researchers, practitioners and interest groups. We strongly support the approach outlined in this resolution emphasizing soil sequestration of atmospheric carbon in soils. It is clearly the best, fastest, most cost-effective and most feasible way to resolve the increasingly divisive controversy over whether, and to what extent, CO₂ emissions from human activity are contributing to climate change. Rep. Noel and Senator Hinkins, sponsors of this resolution, along with all of those in the legislature who supported it and Gov. Herbert deserve great credit for helping focus attention on this approach.

As the resolution itself notes, scientific research and extensive on-the-ground experience shows that this is truly a win/win solution. In fact, in light of the many extraordinary economic and environmental benefits that will result from adopting this common sense approach it can be more accurately characterized as a win/win/win/win/win solution. There literally are no downsides.

We will list some of these “wins,” but as Steve will briefly discuss, properly applying these proven and much more effective management techniques to increase soil carbon sequestration to forest, range and agricultural lands is guaranteed to work. It is not hypothetical or experimental. The basic mechanisms involved literally have been perfected, proven and demonstrated by nature since the first terrestrial green plants appeared.

As HCR 8 specifically notes, the potential for removing atmospheric carbon and sequestering it in soil is immense. For example, Dr. Fred Provenza, a world renowned grazing expert and professor emeritus at Utah State University, and several colleagues have concluded based on scientific research results and practical applications that the world’s former and current rangelands alone could sequester all the CO₂ emitted by human activities for the last 10,000 years. Think about that for a minute and what it means. And this projection does not even take into consideration the world’s extensive forest lands, another, though less stable, carbon sink. They further conclude that this massive sequestration of atmospheric carbon could be achieved in a matter of decades and at net economic and environmental benefit. We have attached the abstract of that paper, which is readily available on the Internet.

Here are some of the benefits associated with this approach:

- As I mentioned, it is cheaper and vastly more cost-effective than any of the other alternatives for dealing with CO₂ control that are being considered.
- The atmospheric carbon is, in effect, permanently sequestered.
- It is, in fact, the only politically and economically practicable approach that can achieve the reduction goals that those most concerned about climate are saying must be met.
- It will generate economic benefits at all levels where ever it is implemented, revitalizing rural economies as well as those of states and the nation.
- It automatically produces numerous environmental benefits including improved wildlife habitat, better watershed health with increased water quality and quantity, greater biodiversity, reduced danger of catastrophic wildfires, increased forage production, improved recovery of threatened, endangered and sensitive species, enhanced production of renewable natural resources such as timber and forage and expanded recreational opportunities.
- It reduces or completely eliminates use of agrichemicals.
- It restores and re-creates depleted top soils, enhancing food quality and security.
- It increases drought resistance of forest, range and agricultural lands.
- It eliminates the primary opposition to use of fossil fuels generally, especially coal. This has major national security and economic implications for the U.S. and worldwide and permits a more economically rational path to developing alternative energy sources.
- It is truly something on which the U.S. can demonstrate leadership for the world and show that any country, notably the major emitters like China and India, can also apply this approach to offset their own emissions.

In light of all this, it should be clear that emphasizing sequestering carbon in soils would make the current debate over whether and to what extent CO₂ is causing climate change essentially irrelevant. For those who want to significantly reduce atmospheric CO₂ loadings, soil sequestration offers far greater potential to do so more quickly and on a much larger scale than do any other alternative being considered.

For those on the other side of the climate debate who are concerned about the economic costs, dislocations and other damage that would be caused by the heavy command and control approach currently being pursued by the federal government, soil sequestration not only does not inflict these costs but actually generates net benefits instead. In fact, people around the world are already employing these techniques to sequester carbon simply because of the many economic benefits that result. For them, reducing atmospheric CO₂ loadings and improving the environment are simply additional benefits. We frequently find that when people understand the power of this approach, they, like us, are eager to see as much atmospheric carbon in soils as possible.

We think an additional important consideration is that if the climate skeptics prove to be right, then we will not have wasted hundreds of billions of dollars or needlessly incurred the economic damage that will result from implementing most of the other approaches being considered. Instead, there will be so many measurable benefits from soil sequestration that the relatively small expenditures involved can easily be justified on that basis alone.

Since HCR 8 speaks largely to the application of this approach to federally managed lands in Utah we want to focus on that aspect and what the commission could consider doing. But first, Steve is going to give a brief overview of how carbon is sequestered in soils, how this can be done more effectively and some of the problems with doing this on public land. Steve is a rancher, author, educator and range management consultant with nearly 40 years of experience. He was one of the witnesses at the groundbreaking congressional hearings Rep. Rob Bishop held last year on the potential of soil sequestration on public lands.

Researchers estimate that past agricultural and forestry practices have cost us half of our nation's life-giving soil carbon. The situation is similar or worse in other parts of the world.

Thankfully, however, because of new scientific breakthroughs, human civilization has been granted a "Do-over." We can now potentially restore even continent-sized areas of severely degraded soils, and recover the low-cost, high-yield agricultural production, biodiversity, and ecological opportunities of former centuries.

Not long ago, even leading soil experts believed that native topsoil was primarily created by the decay of *dead leaf-fall*, from trees, shrubs, and grasses, etc.

But we now understand that nature has always used a *much more powerful, far faster* process in rangelands and grazable woodlands. We now know that the main process for sequestering carbon occurs underground, fed by sunlight, falling on living leaves. It's often called the "*Liquid Carbon Pathway*." This mechanism hugely extends the size and effectiveness of root systems of most plants. *Worldwide, mega-tonnages of atmospheric carbon dioxide* are mixed with water, in plant leaves, and through the process of photosynthesis, is turned to *liquid sugars*. *These are* then sent underground and through ports in root hairs, are exchanged for minerals and water gathered by a complex soil community, consisting of fungi, mineral-extracting, nitrogen-fixing, and other bacteria, etc. The sugar is transported through acres-large mats of fungal tubing and feeds vast tonnages of biodiversity underground. Plants connected in this way photosynthesize *at least 40% faster*.

Grazing animals, in herds, scientifically controlled, are ***powerful and necessary*** parts of this symbiosis. Their eating and trampling of plant material, their dung, urine, and micro-organic soil inoculation, soil trampling, etc. creates many ecosystem services and greatly accelerates soil formation.

Examples:

- 1.) Deseret Ranch, in Utah, mentioned in HCR 8 is an internationally recognized , landscape scale rangeland example (205,000 acres). Principles used at Deseret are being successfully applied on millions of acres worldwide as well as on nearby properties. Soon after adopting effective grazing practices, optimizing timing, frequency and intensity of grazing and rest periods, the watershed healed, flooding ceased, meadow areas doubled in size, riparian areas healed, wildlife populations flourish, from Mule Deer, elk, moose and pronghorns to Whitetailed Prairie Dogs (the largest colony on Earth is here).

Sage Grouse and other sensitive species are all thriving. Native biodiversity has increased greatly. The prestigious Society for Range Management gave Deseret Ranch their highest award. The Audubon Society named the ranch a “World Wide Important Bird Area” for its 10-fold increase in Sage Grouse and other important bird populations, and its 200 species bird list. Further, ranch finances went from severe losses to many-times-above average profitability.

- 2.) The prestigious journal “Nature,” referring to targeted grazing on thousands of acres of grass-fed dairies in the Southeast U.S., recently reported that “ ...within a decade of management-intensive grazing practices, soil C [organic carbon] levels returned to those of native forest soils...”
- 3.) The Brown Ranch, in far more arid N. Dakota, working with leading federal scientists to optimize and integrate scientific livestock grazing with the use of mixed cover crops, has seen soil carbon levels rise from as low as a severely degraded 1.5 % to as high as a very impressive 11.5 %.

These un-irrigated soils yield a large livestock income—and 30% more corn—without the need for fertilizers, etc., at around 1/3rd the normal total cost. Such methods would also end excess-fertilizer runoff pollution of groundwater, lakes and rivers, and the massive, fertilizer-caused, “Dead Zones” devoid of most aquatic life that form annually in the Gulf of Mexico and other ocean areas.

- 4.) The Brown Ranch also recently absorbed a 13.5 inch in 24 hour rainfall event without soil loss. Neighbor’s properties flooded and turned into lakes. His soil’s water absorption capacity grew from a measured half inch per hour before applying these agricultural practices to a measured 6 inches per hour, effectively multiplying drought tolerance. Such capacity would end flooding losses in watersheds around the country. For dry Utah, the benefits of such improvements are many and obvious.
- 5.) In Morgan, Utah, on a smaller scale (using the same concepts) the State Range Conservationist for the USDA NRCS —over several years—increased soil health and forage production to feed 9 stocker cattle on land that formerly supported only 2. To this agency’s credit, the USDA-NRCS is actively supporting these soil health

measures on private and state lands. As with any paradigm shift, some people, including rigid doctrinaire scientists, are left behind.

There are many, many other examples.

As HCR 8 states, federal policy—deeply influenced by often ill-informed lawsuits—has led to many catastrophic consequences on BLM and Forest Service lands. Most visible are wildfires, at scales never before witnessed, like the 576 square mile Milford Flat Fire in Utah, two half-million acre fires in Arizona, etc. Severe fires sterilize soils to a 6 inch depth, create water-repellant soil crusts, and lead to severe, highly erosive flooding. Tens of millions of acres of bark beetle-killed trees have the same cause: too many trees, too little management. Research demonstrates that thinning tree stands ends both plagues, allows remaining, now-healthy trees to grow much faster, storing 30% more carbon than dense tangles, and opens the more powerful Liquid Carbon Pathway as grasses, etc. reestablish.

Less visible to non-experts is the disastrous consequences of increased dominance of woody species (trees and shrubs) on Utah's rangelands. Beyond certain thresholds, these cause 90%-plus biodiversity losses, as also happens in dense tall conifer forests.

Again, due to lawsuits and often ideologically-driven hostility or plain ignorance on the part of some federal managers, the healing grazing and forest management processes called for in HCR 8 are largely prohibited on federally managed lands. These regulations must change, as must others, if Utah's public land's soils and habitats are to heal, and become the effective carbon sinks they could be.

A further problem is an incompetent, often corrupt system of activists poisoning the scientific and legal record with obviously unscientific falsehoods and misrepresentations. This must end. In my consulting practice on multiple occasions I have encountered such outrageous claims as that cattle threaten endangered fishes by eating adults, juveniles and eggs, that dry washes are critical habitat for species such as the Lahontan Cutthroat Trout and endangered Chubs, etc. I've seen several native fish species populations actually extinguished by misguided federal actions on vast stretches of Arizona rivers, and witnessed federal agencies ignore solid findings that would have saved endangered species. These are only a few of many, many examples just from my personal experience. No federal action is immune from this kind of incompetence and junk science.

More specifically with respect to HCR 8 we saw this kind of ignorance and misrepresentation reflected in an op/ed piece by a couple local activists in the Deseret News challenging the approach suggested in HCR 8. We have attached a copy of our response and analysis of that op/ed highlighting some of the major problems with it.

We have a choice. We can have a renewed, far better world of deep rich soils, thriving ecosystems and prosperous people and wildlife —or— we can have policies that continue to get almost everything wrong.

In closing let us focus on some of the implications for the state and for this commission.

HCR 8 has called on the federal management agencies to aggressively implement range and forest management practices that will sequester vastly more carbon on the lands they manage and at the same time generate all the many economic and environmental benefits we have outlined here. The resolution also directs state agencies to do this where possible on state lands and to encourage these management practices on private lands as well. So, it is probably safe to say that if the state were managing these lands instead of the federal agencies, these kinds of enlightened and proven management approaches would be implemented. Without question that would result in vastly improved economic and environmental health and productivity. In other words, the state would be exercising far better stewardship of these lands and resources than the federal government is presently.

Short of transfer of control to the state, there are areas where the federal agencies could improve the health and productivity of these lands by making management changes that would cost little or nothing beyond what they are already spending. This would include significantly improving them as carbon sinks and reducing emissions of CO₂. So they are currently exercising poor stewardship under a business as usual scenario.

But, as HCR 8 notes, these agencies have been specifically tasked by President Obama in Executive Order 13653 to Increase soil carbon sequestration and to make changes in regulation, policies and programs to reduce the sources of climate change. The relevant section of this EO is attached with these directives highlighted. The federal agencies can only comply with this presidential directive in any significant way by changing current management practices and implementing the kind of management approaches outlined in HCR 8.

Since the federal agencies management decisions have such a major impact on the state, we think that it is appropriate for the state ask these agencies what they are doing pursuant to this executive order. And it is only things they are doing in addition to what they normally would be doing that would count as complying. To be sure, the minimal amount of pre-suppression fire activity, range improvements and similar things that the agencies are doing anyway do, in fact, sequester carbon and reduce emissions. But the executive order calls on them to do more than that.

It is our impression that, with the exception of the NRCS, the agencies are not doing much if anything pursuant to the directive in this executive order. As Steve has mentioned, for a number of reasons we are not confident that they can do it quickly and effectively and on a scale that will have a significant impact or even offset the various current sources of emissions from the public lands.

We urge the commission to invite the agencies to explain how they are carrying out their stewardship responsibilities in this regard and what their future plans are to do so.

Again, thank you for this opportunity. We will be happy to answer any questions.

